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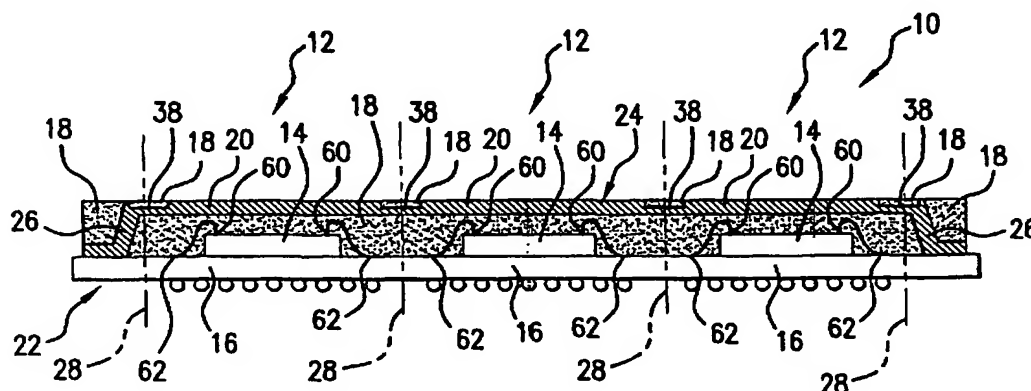
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(54) Title: THERMAL ENHANCED PACKAGE FOR BLOCK MOLD ASSEMBLY



(57) Abstract: A heat spreader (20) is added to a package to enhance thermal and advantageously electrical performance. In manufacture, a heat spreader precursor (24) is advantageously placed over a group of dies and secured after bonding (e.g., wire or tape bonding or flip-chip bonding) and before matrix/block mold. For example, a package strip (10) may consist of a row (linear array) of groups of die attach areas (e.g. in a rectangular array of four). The heat spreader precursor (20) may accommodate one such group or multiple groups along the package strip (10). The package strip (10) may then be singulated to form the individual packages. Each singulated package includes a die (14), its associated substrate 16 (e.g., either a lead frame or interposer type substrate) and a portion of the heat spreader precursor (24) as a heat spreader (20).

**AMENDED CLAIMS**

[received by the International Bureau on 13 October 2004 (13.10.04);  
original claim 1 amended, other claims unchanged]

1. A device comprising:

a substrate (16) having first and second generally opposite surfaces, the  
substrate (16) first surface having a plurality of bond sites (62) disposed thereon;

5 a die (14) mounted to the first surface of the substrate (16), the die (14) having  
first and second generally opposite surfaces parallel to the substrate (16) first and second  
surfaces, the die (14) first surface having a plurality of I/O pads (60) disposed thereon, the I/O  
pads (60) being electrically connected to the bond sites (62);

10 a molding compound (18) encapsulating the die (14) and at least the first  
surface of the substrate (16);

a heat spreader (20) at least partially embedded in the molding compound (18)  
and having a peripheral cut edge portion (32) aligned with and not recessed from associated  
peripheral cut edge portions (34, 36) of the substrate (16) and molding compound (18).

15 2. The device of claim 1, wherein the heat spreader (20) has first and second  
generally opposite surfaces parallel to the die (14) first and second surfaces, the heat spreader  
(20) second surface being covered by the molding compound (18) and the heat spreader (20)  
first surface being uncovered by the molding compound (18).

20 3. The device of claim 2, wherein the heat spreader (20) is thermally connected to  
the die by a material (88) having a thermal conductivity higher than a thermal conductivity of  
the molding compound (18).

25 4. The device of claim 2, wherein the heat spreader (20) includes a protrusion  
(100) extending from the heat spreader (20) second surface, the protrusion contacting the die  
(14).

5. The device of claim 1, wherein the heat spreader (20) includes a down-set leg  
(52) contacting the substrate (16) first surface.